The unprecedented rate of deforestation and forest degradation in Kenya has resulted in acute wood shortage. To address this problem, eucalyptus tree hybrids clones were donated to Tree Biotechnology Project in Karura, Kenya by Mondi Forest of South Africa. To evaluate the best planting eucalyptus germplasm, five long-term trials consisting of both eucalyptus hybrid clones and the local progeny in Karura, Machakos, Kabage, Embu and Gede were studied. The study sought to establish the height and diameter growth, stem formation, self-pruning ability, straightness, branching and crown formation of the introduced eucalyptus hybrid clones and the non-hybrid eucalyptus germplasm in different sites. In each trial, 20% of the trees in each plot were selected randomly and height and diameter measurements were taken by use of a sunto and diameter tape respectively. Observations were made on stem form, crown size, branching, self-pruning and survival rate. Analysis was carried out by use of descriptive and inferential statistics. The Genstat Statistical Package was used to carry out both the ANOVA and LSD tests on both DBH and height in all eucalyptus varieties under study. In Karura site there was significant mean height growth variation between the introduced eucalyptus clones and the non-hybrid E. tereticornis and E. saligna, with the clones exhibiting, high survival rates and high level of straightness (95% and 65% respectively). E. grandis exhibited similar growth to clones but with low survival rate. In Embu, the eucalyptus hybrid GCs 642 and 15 achieved significantly high mean height than the non-hybrid varieties. Similarly, the eucalyptus hybrid clones achieved high survival rates (above 95%) compared to E. grandis, E. saligna and E. camaldulensis. In Machakos, E. grandis achieved similar mean height to eucalyptus hybrids apart from eucalyptus hybrid GC 10. Survival rate for all the eucalyptus germplasms in this site apart from E. saligna was over 85%. E. grandis attained relatively high level of straightness (90%) with eucalyptus hybrids GCs 642, 14, 15 and 581. In Kabage, Nyeri, there were no significant difference for both mean height and mean DBH (LSD 1.3 and LSD 1.67) between the non-hybrid E. grandis and hybrid GUs. The high survival rate and straightness of E. grandis was comparable to that of GU 7 (89%), GU 8 (96%) and TAG 5 (pure grandis) respectively. In Gede, significant variation in mean height was observed between progenies. However, eucalyptus hybrids GCs 785, 581, 167 and 584 achieved a significantly high mean height compared to the rest of eucalyptus germplasms. For the mean DBH, eucalyptus hybrid GCs 785, 581, 167 and 584 compared favourably with non-hybrid E. camaldulensis, hybrid GU 21 and hybrid GC 540. The survival rate was high (over 85%) for all the progenies apart from hybrid GC 796 which failed. Crown diameter for the non-hybrid progenies were small compared to those of GUs and GCs, and apart from the hybrids GC 785 and GC 167, all others achieved high branching (over 60%). From the results, the GCs performed well in height, DBH and survival rate than local land races in Karura and Embu, the E grandis exhibited exceptional performance among the local land races in all sites it was planted and GCs are the suitable progeny for a number of agro climatic zones across the country as E tereticornis comes out as the least suitable among the local land races. The study recommends aggressive extension strategy for the suitable hybrids, monitoring of their health as well as continued research and silvicultural studies to find more on their effect on hydrology and soils as well as market reliance.

**Supervisors:** Dr. James B. Kung’u  
Dr. Samuel C.J. Otor